

**SUPERFUND RESPONSE ACTION PRIORITY PANEL REVIEW FORM**

**Date Form Completed:** October 28, 2013

**General Site Information**

Region:	6	City:	Collinsville	State:	OK
CERCLIS EPA ID: OKD987096195	CERCLIS Site Name: Tulsa Fuel & Manufacturing Superfund Site				
NPL Status: (P/F/D)	Final	Year Listed to NPL:	1999		

**Brief Site Description:** *(Site Type, Current and Future Land Use, General Site Contaminant and Media Info, Site Area and Location information.)*

The Tulsa Fuel & Manufacturing (TFM) Site is located approximately 1.3 miles south of downtown Collinsville in Tulsa County, Oklahoma. The site is a 60.7 acre abandoned zinc smelter that operated from 1914 through 1925. The TFM site is bounded by Highway 169 and railroad tracks to the east, a flooded strip mine from a former coal mining operation to the south, and agricultural and residential lots to the north and west. Additionally, an active church bounds the TFM Site to the north.

The smelting operation at the TFM Site utilized nine furnaces, which were fueled by nearby natural gas wells. Former structures at the site included a mechanical kiln, a condenser and a laboratory. A two million gallon capacity pond at the site was used for cooling water during smelting operations. Large amounts of ore were stored on site. There are approximately 200,000 cubic yards of waste on the smelter property affected with high levels of arsenic, lead, and cadmium.

The majority of the facility structures have been demolished; only a few foundations and footings remain. The TFM Site is covered with waste consisting of broken retorts and condensers, slag, building debris, ash, bricks, and other materials from the former smelting operations. The majority of the waste areas are devoid of vegetation. The waste varies in thickness from surface contamination (approximately 6 inches) to greater than 6-feet. The waste piles are not covered, and run-off is uncontrolled. The Site borders a strip mine pit to the south, and portions of the wastes have collapsed into this feature. Three intermittent ponds, which are assumed to be remnants of a 2-million gallon pond, are located north of the former smelter operations area. In addition, two smaller ephemeral ponds are located on the site. A fence surrounds the site, with the exception of the southern boundary at the strip mine pit; however, there is evidence of hunting and fishing activities around the ponds and strip mine pit.

A residence, which was occupied from 1935 through February 2002, was located on the site near the former office building (paymaster hut). The on-site residence was destroyed by a fire and is currently unoccupied. The residence has a well that was used in the past for drinking water, but is no longer in use. No other residential structures are located on the site; however, a garage and a few storage sheds remain adjacent to the former residence. Waste material at the TFM Site has affected soil, sediment, and surface water. Ground water at the TFM Site has not been impacted by the site-related waste.

The Site includes large areas vegetated by various grass species, trees, and shrubs, creating diverse habitat types. There are areas of dense vegetation interspersed with sparsely vegetated areas and patches of bare or rocky ground. A line of blackberry bushes approximately 1400 feet long is located along the eastern boundary of the site and residents trespass on the site to harvest the berries. According to the U.S. Fish and Wildlife Service and Oklahoma Biological Survey records, three state and federally protected wildlife species are known or are likely to occur at the site.



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The current land use surrounding the TFM Site includes mixed agricultural, commercial, and residential. In addition to the footprint of the historical smelter several properties surrounding the TFM Site will be addressed. This includes two residential properties, located to the west, that have historical smelter roads running through them and large portions of a lot owned by the church which is located directly to the north of the TFM Site. Portions of a property located to the south surrounding the strip mining pit are also impacted. Although the TFM Site is currently unused vacant land, it is reasonable that future land use may be zoned residential based on its proximity of only 1.3 miles from downtown Collinsville and development interest in the general area.

**General Project Information**

Type of Action:	Remedial Action	Site Charging SSID:	06FPRD00
Operable Unit:	OU1	CERCLIS Action RAT Code:	RA001
Is this the final action for the site that will result in a site construction completion?			<input checked="" type="checkbox"/> Yes      No
Will implementation of this action result in the Environmental Indicator for Human Exposure being brought under control?			<input checked="" type="checkbox"/> Yes      No

**Response Action Summary**

Describe briefly site activities conducted in the past or currently underway:

The TFM Site was proposed to the Superfund NPL on September 29, 1998. Final listing of the TFM Site to the NPL occurred on January 19, 1999. The remedial investigation/feasibility study was undertaken from 2005 through 2007. The Record of Decision (ROD) was issued in November 2008. The media of concern includes on-site soil and waste materials, sediment, and surface water. The selected remedy addresses the TFM Site as one operable unit to manage the current and potential future residential risks associated with exposure to soil, sediment, surface water, and waste. An estimated 200,000 cubic yards waste material will be addressed through on-site consolidation and capping. In addition to on-site material, a limited volume of material will be brought on-site from adjacent properties. These areas include residential acreages, a portion of a church property, right-of-ways, and agricultural areas. Remedial design (RD) activities began in late 2010 under a cooperative agreement with ODEQ. Currently, the RD is proceeding through Final Design. The RD addresses all the elements of the ROD.

Specifically identify the discrete activities and site areas to be considered by this panel evaluation:

This evaluation addresses the full OU1 ROD. No other operable units exist at the site. The activities include:

Site Preparation: Erosion control measures, clearing and grubbing, and demolition of several structures will be required prior to consolidation of waste material.

Cell Construction: An on-site cell will be constructed in the southeast portion of the site that will have a capacity of 200,000 cubic yards. The cell is designed as a non-hazardous waste landfill in accordance with ODEQ's solid waste rules.

Excavation and Consolidation: Approximately 200,000 cubic yards of contaminated soils, smelter wastes, and sediment will be excavated and placed in the on-site cell. Off-site and on-site waste consolidation will occur simultaneously under a single mobilization.

Stabilization: TCLP testing will be performed for samples of soil, sediment, and waste. Should the samples exceed TCLP regulatory levels, the material would be required to be treated.

Cap Installation: The cell cover will be constructed to meet Oklahoma standards for a non-hazardous landfill. The cap includes a 3 foot soil cover. A seeding mix will be applied that will provide for establishment of vegetation.

Stormwater Control: In addition to stormwater control structures (currently being addressed as a component of the intermediate design phase), stormwater detention will be provided to control increased runoff from the site.



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Site Restoration: Site restoration includes the construction of access roads, site fencing and signage, and establishing vegetation.

Long-Term Monitoring and Maintenance: Groundwater monitoring wells will be installed to meet Oklahoma requirements for long-term monitoring.

The implementation of the full scope of work is expected to take 9 months.

Briefly describe additional work remaining at the site for construction completion after completion of discrete activities being ranked:

None.

### Response Action Cost

Total Cost of Proposed Response Action:

*(\$ amount should represent total funding need for new RA funding from national allowance above and beyond those funds anticipated to be utilized through special accounts or State Superfund Contracts.)*

\$5,764,866 = Total Cost of Proposed Response Action

Source of Proposed Response Action Cost Amount:

*(ROD, 30%, 60%, 90% RD, Contract Bid, USACE estimate, etc...)*

Preliminary Design and Basis of Design Report

Breakout of Total Action Cost Planned Annual Need by Fiscal Year:

*(If the estimated cost of the response action exceeds \$10 million, please provide multiple funding scenarios for fiscal year needs; general planned annual need scenario, maximum funding scenario, and minimum funding scenario.)*

# Exemption 5: DP

Other information or assumptions associated with cost estimates?

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**Readiness Criteria**

1. Date State Superfund Contract or State Cooperative Agreement will be signed (Month)?

August 2014

2. If Non-Time Critical, is State cost sharing (provide details)?

3. If Remedial Action, when will Remedial Design be 95% complete?

March 2014

4. When will Region be able to obligate money to the site?

04FY14

5. Estimate when on-site construction activities will begin:

October 2014 is the anticipated mobilization date when on-site activities could begin.

6. Has CERCLIS been updated to consistently reflect project cost/readiness information?

Yes

**Site/Project Name:** Tulsa Fuel and Manufacturing Superfund Site

**Criteria #1 - RISKS TO HUMAN POPULATION EXPOSED (Weight Factor = 5)**

Describe the exposure scenario(s) driving the risk and remedy. Include risk and exposure information on current/future use, on-site/off-site, media, exposure route, and receptors:

Current exposure scenarios, at the TFM Site, include trespasser and recreational scenarios. Future exposure scenarios will include those listed as well as construction, residential, and industrial. The property owners have continued to discuss their intentions of developing their property for residential, recreational, and/or commercial purposes.

Estimate the number of people reasonably anticipated to be exposed in the absence of any future EPA action for each medium for the following time frames: Assume that the radius of individuals being exposed is within 4 miles, which includes the city of Collinsville. Assume original population 5609 <2yrs 4.7% increase (us census)/<10yrs 80% increase (ODEQ estimate) >10yrs 90% increase (ODEQ estimate).

<b>MEDIUM</b>	<b>&lt;2yrs</b>	<b>&lt;10yrs</b>	<b>&gt;10yrs</b>
Soil	5873	10093	10654
Sediment	5873	10093	10654
Surface Water	5873	10093	10654



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Discuss the likelihood that the above exposures will occur:			
<p>Collinsville's close proximity to Tulsa has made the city attractive to residential development and is considered a suburb of Tulsa. In 2009 the Tulsa World reported that Collinsville was one of the fastest growing cities in the state. Additionally, Owasso a city located to the south of Collinsville is experiencing a similar trend. Both Collinsville and Owasso are experiencing growth rates above the national and state averages. Due to the growth of both cities, residential developments are moving in around the superfund site and land values are increasing making what was once agricultural land valuable and attractive for residential and commercial building. The likelihood of the above exposures occurring is high and will continue to increase if no action is taken. Two residents to the west, an active church to the north, and an industrial park to the south are located immediately adjacent to the site. These off-site areas are directly affected by physical transport, migration, and runoff of on-site contamination. As the local population increases, exposure to on-site risks will continue and likely increases as more people live, attend church services, and work in and around this area of Collinsville.</p>			
Other Risk/Exposure Information?			
<p>There is current evidence of onsite trespassing for hunting, fishing, and blackberry harvesting activities on the site. Continued trespassing at the site for blackberry bush harvesting, hunting, and fishing activities will result in human transport of waste into the community. There is also evidence of off-road vehicle tracks at the site. Blackberry bushes are impacted by aerial deposition of soil/dust on leaves/fruit and not by root uptake. The strip mine pit, ponds, and blackberry bushes are on-site features attracting more residents to the site. ODEQ reports that people are now breaking site gate locks to access the site. ODEQ has requested Collinsville police regularly patrol the site to reduce access and avoid a potential safety issue. ODEQ just completed a residential/commercial cleanup in the city of Collinsville to eliminate historical impacts from the smelters. The potential for exposing more people to on-site contamination risks and recontamination of properties is high if a response action is not executed at the TFM Site.</p>			
<b>Site/Project Name:</b>	<b>Tulsa Fuel and Manufacturing Superfund Site</b>		
<b>Criteria #2 – SITE/CONTAMINANT STABILITY (Weight Factor = 5)</b>			
Describe the means/likelihood that contamination could impact other areas/media given current containment:			
<p>Physical transport of on-site wastes occurs through uncontrolled runoff during high rainfall events. Sloughing of the wastes on the southern boundary continues into the adjacent strip mine pit. Collinsville residents have removed broken retorts and slag from the site to shore up culverts and surface driveways; it is likely that residents will continue to be resourceful in use of these materials assuming no cleanup occurred.</p>			
Are the contaminants contained in engineered structure(s) that currently prevents migration of contaminants? Is this structure sound and likely to maintain its integrity?			
No			
Are the contaminants in a physical form that limits the potential to migrate from the site? Is this physical condition reversible or permanent?			
<p>The contamination above action levels is in a physical form (i.e. soil and debris) that limits migration; however, physical transport of the contamination has occurred.</p>			
Are there institutional physical controls that currently prevent exposure to contamination? How reliable is it estimated to be?			
No			



Other information on site/contaminant stability?

Natural recovery is unlikely to occur at the TFM Site as the heavy metal contaminants are present in high volume and concentrations and there is little evidence of natural attenuation at present.

**Site/Project Name:** **Tulsa Fuel and Manufacturing Superfund Site**

**Criteria #3 – CONTAMINANT CHARACTERISTICS (Weight Factor = 3)**

*(Concentration, toxicity, and volume or area contaminated above health based levels)*

List Principle Contaminants (Please provide average and high concentrations.):

*(Provide upper end concentration (e.g. 95% upper confidence level for the mean, as is used in a risk assessment, or maximum value [assuming it is not a true outlier], along with a measure of how values are distributed {e.g. standard deviation} or a central tendency values [e.g., average].)*

<b><u>Contaminant</u></b>	<b><u>*Media</u></b>	<b><u>**Concentrations (95% UCL)</u></b>
Arsenic	SL, ST	SL= 486,8 mg/kg ST= 588 mg/kg
Cadmium	SL, ST	SL=291.5 mg/kg ST= 702 mg/kg
Lead	SL, ST	SL=19,275 mg/kg ST= 8,150 mg/kg

*(\*Media: SL – Soil, ST – Sediment)*

*(\*\*Concentrations: Provide measure [Exposure Point Concentration] used in the risk assessment and ROD the basis for the remedy).*

Describe the characteristics of the contaminant with regards to its inherent toxicity and the significance of the concentrations and amount of the contaminant to site risk. *(Please include the clean up level of the contaminants discussed.)*

Arsenic is considered a carcinogen and has been shown to be carcinogenic to animals and/or humans.

The toxic effects of lead involve several organ systems including the nervous, vascular, and renal systems with critical effects involving the nervous system. In children, lead exposure has been shown to decrease intelligence scores, slow growth, and cause hearing problems.

Based on evaluation of analytical information from the site, it was found that metals of concern are collocated with zinc. Therefore, during the TFM Risk Assessment it was determined that addressing the site human health risks would also address the ecological risks at the site.

**Cleanup Levels:**

**Residential Soil**

Arsenic-37 mg/kg

Cadmium-75 mg/kg

Lead-500 mg/kg

**Sediment**

Arsenic-181 mg/kg

Cadmium-813 mg/kg

Lead-500 mg/kg

**Surface Water**

Cadmium-238 ug/L

Describe any additional information on contaminant concentrations which could provide a better context for the distribution, amount, and/or extent of site contamination. *(e.g. frequency of detection/outlier concentrations, exposure point concentrations, maximum or average concentration values, etc.....)*

<b>On-Site Waste Area Soil</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 13 mg/kg Max = 1,170 mg/kg	46/50	486.8 mg/kg	95% UCL
Cadmium: Min = 21 mg/kg Max = 1620 mg/kg	46/50	291.5 mg/kg	95% UCL
Lead: Min = 181 mg/kg Max = 71,700 mg/kg	47/50	19,275 mg/kg	95% UCL

<b>On-Site Non-Waste Area Soil</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 10 mg/kg Max = 416 mg/kg	47/100	77.78 mg/kg	95% UCL
Cadmium: Min = 1 Max = 799 mg/kg	61/100	96.72 mg/kg	95% UCL
Lead: Min = 11 mg/kg Max = 5,170 mg/kg	73/100	1,029 mg/kg	95% UCL

<b>On-Site Sediment, Sediment in Mid-Site Ravine</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 195 mg/kg Max = 588 mg/kg	3/3	588 mg/kg	NC
Cadmium: Min = 255 Max = 702 mg/kg	3/3	702 mg/kg	NC
Lead: Min = 2,940 mg/kg Max = 8,150 mg/kg	3/3	8,150 mg/kg	NC

<b>Off-Site Sediment, Sediment in Ditches along Highway 169</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 24 mg/kg Max = 341 mg/kg	8/8	271.4 mg/kg	95% UCL
Cadmium: Min = 31 Max = 987 mg/kg	8/8	675.1 mg/kg	95% UCL
Lead: Min = 417 mg/kg Max = 5,080 mg/kg	8/8	3,040 mg/kg	95% UCL



<b>Off-Site Soil, Shallow Soil at 1400 South 12<sup>th</sup> Street</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 21 mg/kg Max = 538 mg/kg	7/7	538 mg/kg	95% UCL
Cadmium: Min = 4 Max = 41 mg/kg	2/7	32.53 mg/kg	95% UCL
Lead: Min = 237 mg/kg Max = 8,950 mg/kg	7/7	8,950 mg/kg	95% UCL

<b>Off-Site Soil, Shallow Soil at Faith Assembly Church</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 10.5 mg/kg Max = 56.8 mg/kg	8/12	28.37 mg/kg	95% UCL
Cadmium: Min = 11.6 Max = 23.7 mg/kg	4/12		
Lead: Min = 12.7 mg/kg Max = 691 mg/kg	11/12	314.0 mg/kg	95% UCL

<b>Off-Site Soil, Shallow Soil at 11727 East 136<sup>th</sup> Street North</b>	Frequency of Detection	Exposure Point Concentration	Statistical Measure
Arsenic: Min = 11 mg/kg Max = 269 mg/kg	8/8	144.5 mg/kg	95% UCL
Cadmium: Min = 2 Max = 18.4 mg/kg	3/8		
Lead: Min = 118 mg/kg Max = 2,850 mg/kg	8/8	1,572 mg/kg	95% UCL

Other information on contaminant characteristics?

**Site/Project Name:** Tulsa Fuel and Manufacturing Superfund Site

**Criteria #4 – THREAT TO SIGNIFICANT ENVIRONMENT (Weight Factor = 3)**

*(Endangered species or their critical habitats, sensitive environmental areas.)*

Describe any observed or predicted adverse impacts on ecological receptors including their ecological significance, the likelihood of impacts occurring, and the estimated size of impacted area:



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The American Burying Beetle is an endangered ecological receptor at the site and there is roughly 60 acres of suitable habitat. Federally listed endangered and threatened species in Tulsa County also include: the Interior Least Tern and the Piping Plover.

Would natural recovery occur if no action was taken?

☐ Yes ☒ No

If yes, estimate how long this would take.

Natural recovery is unlikely to occur at the TFM Site as the heavy metal contaminants are present in high concentrations and there is little evidence of natural attenuation at present.

Other information on threat to significant environment?

**Site/Project Name:**

**Tulsa Fuel and Manufacturing Superfund Site**

**Criteria #5 – PROGRAMMATIC CONSIDERATIONS (Weight Factor = 4)**

*(Innovative technologies, state/community acceptance, environmental justice, redevelopment, construction completion, economic redevelopment.)*

Describe the degree to which the community accepts the response action.

The community accepts the remedial action. ODEQ just completed a residential/commercial cleanup campaign in Collinsville to eliminate historical impacts from smelter wastes and protect public health. The TFM Site is the only smelter that remains within ODEQ's overall cleanup strategy to eliminate contamination exposure risks to Collinsville residents.

Describe the degree to which the State accepts the response action.

The state of Oklahoma is in full agreement with EPA's remedy selection and implementation. The State accepts the response action and encourages its timely implementation of the consolidation and capping components to reduce exposure risks.

Describe other programmatic considerations, e.g.; natural resource damage claim pending, Brownfields site, use of innovative technology, construction completion, economic redevelopment, environmental justice, etc...

The construction completion milestone can be achieved in 9 months, the time to implement the full scope of the response action.

The site is in a small city in northeastern Oklahoma. The community depends on governmental agencies for taking appropriate action to protect human health. There is considerable Cherokee tribal interest in the area. As well as being landowners in the area, several Cherokee tribal members live in close proximity to the TFM Site. The inter-tribal environmental council has participated in all the public meetings as well as had their own community events to inform members on the status and health effects associated with the site.

EPA is pursuing a redevelopment study for the site.